REMARKS

Claims 1, 3-11 and 14-31 are currently pending in the application. Claims 25-31 are withdrawn from consideration.

Claims 1, 3-11 and 14-24 stand rejected under 35 USC §112 as allegedly being indefinite. Applicant will address the alleged problems in the order that they appear.

The term "formed by setting" in claim 1 has been changed to "comprising" as suggested by the Examiner.

In claim 8, the language "from the inlet from externally" has been changed to clarify operation of a filter of the type shown in Fig. 3. That is, water flows in the direction of the arrows 90 from a location that is external to the first porous filter part 102 to and through the first porous filter part 102 and therefrom to and through the second fibrous filter part 104. It is believed that the language as now presented is in full compliance with 35 USC §112.

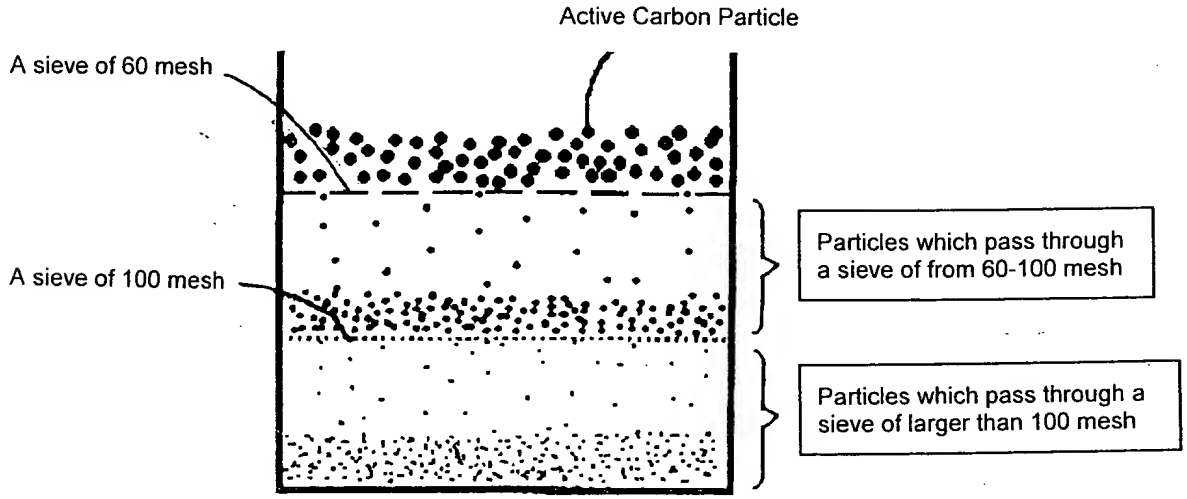
The description "conventional" has been deleted from claim 17.

Claims 1, 5, 21, 22 and 24 stand rejected under 35 USC §103 as obvious over U.S. Patent No. 5,882,517, to Chen et al (Chen), in view of U.S. Patent No. 4,753,728, to Vanderbilt et al (Vanderbilt). Claims 1, 3-11 and 14-24 stand rejected under 35 USC §103 as obvious over Japanese Unexamined Patent Application Publication No. 10-85729 (JP '729) in view of Chen and Vanderbilt.

Reconsideration of the rejection of claims 1, 3-11 and 14-24 is requested.

The Examiner notes on the bottom of page 4 of the Action that claims 1, 3-11 and 14-24 would be allowed if it can be demonstrated that claim 1 requires activated carbon with two different particle sizes, specifically "a first particle size which passes through a 60 mesh sieve but is retained by a 100 mesh sieve, and a second particle size which passes through a 100 mesh sieve".

Applicant reproduces below a drawing as previously submitted that demonstrates the significance of the particle size range as claimed.



The nature of particles that pass through a sieve having a mesh of larger than 100 should not be at issue.

The limitation "60 to 100 mesh" is understood in the industry to mean that the particles can pass through a sieve of 60 mesh, but cannot pass through a sieve of 100 mesh. Thus, the particles which pass through a sieve of from 60 to 100 mesh do not include particles which pass through a sieve of greater than 100 mesh.

Applicant is enclosing herewith a copy of columns 5 and 6 from U.S. Patent No. 6,368,504 in which well recognized industry language is described. It is noted in this patent that the designation "140 x 200" mesh, which is the same as 140 to 200 mesh, means a range of particle sizes smaller than 140 mesh and greater than 200 mesh. This recognized industry convention is consistent with the above drawing. Accordingly, the particles which pass through a sieve of from 60 to 100 mesh are clearly different than those which pass through a sieve of larger than 100 mesh.

Logically, the language "60-100 mesh" would have no meaning if otherwise interpreted. That is, the only meaning that the 100 mesh has in this range is that the particles will not pass through the 100 mesh. Otherwise these particles could collectively be identified as simply passing through one mesh size, as opposed to a mesh range. Inclusion of this range makes this distinction in particle size as shown in the above drawing.

If further clarification is required with respect to this, applicant respectfully requests that the Examiner contact the undersigned. It is believed, however, that the case is now in condition for allowance.

Reconsideration of the rejection of claims 1, 3-11, and 14-24 and allowance of the case are requested.

Respectfully submitted,

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Date: Aug. 18, 2005

provide a threaded member for attaching the carbon block filter **10** to a suitable filter housing.

For purposes of this disclosure, the carbon particle size and size distribution will generally be described in terms of mesh sizes as measured using a generally conventional wet sieve analysis. A wet sieve analysis is a conventional process in which a carbon mixture is separated into ranges or "bins" based on particle size. In general, the carbon mixture is passed, with the aid of water, sequentially through a series of screens, each with progressively smaller openings, down to a 500 mesh screen. Particles larger than the opening size of a specific screen will remain atop that screen while smaller particles will pass through the screen to the next smaller screen. Particles smaller than the openings of 500 mesh screen are typically referred to as "fines." The level of fines can vary significantly from carbon mixture to carbon mixture, and in some carbon mixtures may comprise as much as 20% by weight. Fines are typically disregarded by the carbon producers themselves in grading their carbons. In this disclosure, including the claims, fines are considered for purposes of particle size distribution, but are disregarded for purposes of mean particle diameter. As an expedient, conventional mesh size notation will be used to refer to size ranges. More specifically, the notation "+" in front of a mesh size refers to particles too large to pass through a screen of the noted size. For example, +140 mesh refers to particles that are too large to pass through a screen of 140 mesh size. Similarly, the notation "−" in front of a mesh size refers to particles small enough to pass through a screen of the noted size. For example, −500 mesh refers to particles that are small enough to pass through a screen of 500 mesh size. Using this notation, the term "fines" refers to −500 mesh carbon particles. In referring to particle distributions, the notation "x" between two mesh sizes refers to a range of sizes. For example, 140×200 refers to a range or bin of carbon particle sizes smaller than 140 mesh and greater than 200 mesh.

The unique nature of the carbon mixture of the present invention is described in connection with FIGS. 2–3. FIG. 2 shows the particle size distribution, by weight, of a typical prior art 80–325 mesh carbon. The illustrated distribution is representative of a typical 80×325 mesh carbon that might be obtained using a conventional wet sieve analysis, but it should be recognized that typical 80×325 mesh carbon will vary in particle size distribution and in mean particle diameter from manufacturer to manufacturer and from production lot to production lot. Typical 80×325 mesh carbon is available "off the shelf" from a number of known carbon manufacturers, and is used by a variety of carbon block filter manufacturers without modification. The bar chart of FIG. 2 is divided into "bins" or ranges, each bin showing the percentage, by weight, of carbon particles that fall within that particular size bin. For example, the bar over 100×140 shows the percentage, by weight, of particles that are smaller than 100 mesh and greater than 140 mesh. As illustrated, the percentage of +140 mesh particles is greater than 40%. In this representative distribution, the mean particle diameter is approximately 98 microns. The carbon block filters manufactured from this carbon suffer from a variety of disadvantages, including lower filtration performance. FIG. 3 shows the particle size distribution, by weight, of a prior art modified 80×325 mesh carbon measured using a conventional wet sieve analysis. This carbon is referred to as "modified" because it is produced by a modified grinding process designed to provide a reduced mean particle diameter. More specifically, the modified 80×325 mesh carbon is ground to provide an increased level of fines, which in turn reduces the mean particle diameter and provides better filtration performance. As illustrated, the percentage of +140 mesh particles is greater than 25% and the percentage of −500 mesh particles is nearly 20%. Carbon block filters manufactured from this modified 80×325 mesh carbon provide improved filtration performance s compared to filters manufactured from typical 80×325 mesh carbon, but they suffer from other disadvantages. For example, filters manufactured from the modified 80×325 mesh are relatively soft, suffer from reduced flow rates and have production yield losses of up to 20%.

FIG. 3 also shows the particle size distribution, by weight, of a carbon mixture in accordance with a preferred embodiment of the present invention as measured using a conventional wet sieve analysis. As illustrated, the percentage of +140 mesh particles is less than 5% and the percentage of −500 mesh particles is approximately 7.5%. Carbon block filters manufactured with the unique carbon of the present invention have dramatically improved production yields (up to 98%) when compared to the modified 80×325 mesh carbon. Additional advantages of the present invention over the typical and modified 80×325 mesh carbons of the prior art are described below.

The present invention provides improved filtration performance over carbon block filters manufactured from carbon mixtures with a larger mean particle size, such as the typical 80×325 mesh carbon represented in FIG. 1. First, filters with smaller mean particle diameters provide improved mechanical filtering. This is because the spaces between the carbon particles through which the water must flow are, on average, smaller. Because the spaces are smaller, they mechanically trap smaller particles and provide improved mechanical filtration. Second, filters with smaller mean particle diameters also provide improved filtration over time. FIG. 4 is a graphic illustration of the improved filtration performance provided by carbon block filters of lower mean particle diameter. FIG. 4 compares the reduction in chloroform over time provided by filters of different mean particle diameters when tested in accordance with ANSI/NSF 53 -1999*a*, entitled "Drinking Water Treatment Units-Health Effects, VOCs Reduction," which is incorporated herein by reference. This test is designed to provide a measure of the life of a filter by measuring the amount of water that a given filter can treat before it fails to provide a specified level of filtration. As defined in ANSI/NSF 53 -1999*a*, a filter fails when it is no longer capable of providing at least a 95% reduction in chloroform levels. Line A is a plot of the percent reduction in chloroform provided by a carbon block filter having a mean particle diameter of 92 microns for influent having average chloroform levels of 340 parts per billion ("ppb"). As shown, the performance of this filter begins to tail off dramatically once approximately 1200 gallons of water have been treated. In fact, the filter fails the 95% reduction standard set by ANSI/NSF 53 -1999*a* after approximately 1650 gallons have been treated. Line B is a plot of the percent reduction in chloroform provided by a carbon block filter having a mean particle diameter of 65 microns, again for influent having average chloroform levels of 340 ppb. As shown, the performance of this filter remains well over 95% even after 2000 gallons of water have been treated, thereby evidencing improved filtration performance over time.

The present invention also provides improved flow rates over conventional carbon block filters manufactured from the modified 80×325 mesh carbon of the prior art. FIG. 5 illustrates the flow rate of water through the tested carbon block filters under pressures ranging from 10 to 30 pounds